Journal of Law, Technology & the Internet • Vol. 9 • 2018

FROM ALICE TO BOB: THE PATENT ELIGIBILITY OF BLOCKCHAIN IN A POST-*CLS BANK* WORLD

Antonio M. DiNizo Jr.*

ABSTRACT

Every year the World Economic Forum publishes a list of the top ten emerging technologies. This list of breakthrough technologies has included 3-D printing, self-healing biomimicry materials, and human microbiome therapeutics. In 2016, the financial technology Blockchain dominated the list. Over $1 billion was invested into Blockchain technology and major financial firms are actively exploring Blockchain innovation.

As innovators enter the Blockchain space, they have pushed for patent protection. This Note examines whether Blockchain is patent eligible. Patent eligibility for business methods and software patents is determined under the Supreme Court's holding in *Alice v. CLS Bank*. The first section of this note discusses the technological aspects of Bitcoin and Blockchain. Blockchain was originally developed for the decentralized digital cryptocurrency Bitcoin: however, Blockchain is not tied to Bitcoin and possesses a variety of uses that could potentially revolutionize our financial system.

The second section of this note discusses patent eligibility. The third section applies patent eligibility to Blockchain, discusses why Blockchain should be patent-eligible, and discusses how patent attorneys should draft Blockchain patents. The fourth section discusses the regulatory implications granting Blockchain patent-eligibility and this Note concludes by summarizing my overall thesis that Blockchain is patent-eligible.

* Antonio M. DiNizo Jr. is a third-year law student at The George Washington University Law School and received his B.S. in Business Organization from the Pennsylvania State University Smeal College of Business in May 2014. He is a Senior Staff Member for the Federal Circuit Bar Journal, a Thurgood Marshall Scholar, and possesses a Series 7 and Series 66 Financial Industry Regulator Authority Certification. He would like to thank fellow GW Law student, Dorea Kyra Batté, for her endless encouragement and support during the drafting process.

Table of Contents

INTRODUCTION

Every year the World Economic Forum publishes a list of the top ten emerging technologies that will likely have the biggest impact on the world[1]. This list includes a diverse list of breakthrough technologies that may eventually help solve some of the most pressuring technological challenges our world faces[2]. In previous years, the World Economic Forum has recognized synthetic biology and metabolic engineering[3], 3-D printing and remote manufacturing[4], self-healing biomimicry materials[5], and human microbiome therapeutics[6]. While some technologies included on the list are not new, selection is based on the likelihood that the technology will meaningfully impact our world[7]. In 2016, Blockchain dominated the list[8].

Our society is going through a digital revolution: the world is at our fingertips and digital technology has encroached almost every aspect of our lives[9]. The financial services industry is no exception to this sweeping change to our way of life[10]. Financial technology, or FinTech for short, is the dynamic intersection between the financial services industry and the computer technology industry[11]. FinTech includes any technological innovation that effects how people transact business or deliver financial solutions[12]. In 2015, investments into the FinTech

---

[1] Olver Cann, *These are the Top 10 Emerging Technologies of 2016,* WORLD ECON. F. (Jun. 23, 2016), https://www.weforum.org/agenda/2016/06/top-10-emerging-technologies-2016/.
[2] *Id.*
[3] Glob. Agenda Council on Emerging Technologies, *The Top 10 Emerging Technologies for 2012,* WORLD ECON. F. (Feb. 15, 2012), https://www.weforum.org/agenda/2012/02/the-2012-top-10-emerging-technologies/.
[4] David King, *The Top 10 Emerging Technologies for 2013,* WORLD ECON. F. (Feb. 14, 2013), https://www.weforum.org/agenda/2013/02/top-10-emerging-technologies-for-2013/.
[5] *Id.*
[6] Noubar Afeyan, *Top 10 Emerging Technologies for 2014,* WORLD ECON. F. (Sept. 1, 2014), https://www.weforum.org/agenda/2014/09/top-ten-emerging-technologies-2014/.
[7] Olver Cann, *These are the Top 10 Emerging Technologies of 2016,* WORLD ECON. F. (Jun. 23, 2016), https://www.weforum.org/agenda/2016/06/top-10-emerging-technologies-2016/
[8] *See Id.*
[9] *Blurred Lines: How FinTech is Shaping Financial Services,* PWC GLOB. FINTECH REP., 3 (Mar. 2016), https://www.pwc.de/de/newsletter/finanzdienstleistung/assets/insurance-inside-ausgabe-4-maerz-2016.pdf.
[10] *Id.*
[11] *Id.*
[12] Douglas W. Arner, Jànos Barberis & Ross P. Buckley, *The Evolution of FinTech: A New Post-Crisis Paradigm?* 47 GEO. J. INT'L L. 1271, 1272 (2016); *What is FinTech*, INVESTOPEDIA, http://www.investopedia.com/terms/f/fintech.asp (last visited Apr. 4, 2017).

industry grew 75%, surpassing the $22 billion mark[13]. Financial technology is expected to place over 20% of the financial services industry at risk of being obsolete, with FinTech encompassing the reinsurance industry, the commercial banking industry, the brokerage services industry, the wealth management industry, the consumer banking industry, and the fund transfer and payment industry[14].

Blockchain is a rapidly evolving financial technology that offers revolutionary potential in how people transact business[15]. While Blockchain started as the technology that powers the digital cryptocurrency Bitcoin and became publically known in 2008[16], venture capitalists have recently taken interest in Blockchain investing over $1 billion into the technology in 2015 alone[17]. Blockchain is described as a technology that can radically disrupt the way markets and governments work, creating massive economic and social chang[18]. Blockchain can radically reshape the way we transfer funds; purchase insurance securities; record contracts; sell real estate, sports tickets, stock, and almost any type of property; and process secure business transactions[19]. Blockchain poses a threat to governments, international currency converters, attorneys, financial institutions, brokers, and a host of other business professionals[20].

Despite its consideration as a game changing technology, Blockchain is still relatively unknown to financial services executives[21]. A recent poll found that approximately 25% of financial industry executives had no familiarity with

---

[13] *Global Fintech Investment Growth Continues in 2016 Driven by Europe and Asia, Accenture Study Finds*, ACCENTURE (April 13, 2016), https://newsroom.accenture.com/news/global-fintech-investment-growth-continues-in-2016-driven-by-europe-and-asia-accenture-study-finds.htm.

[14] *Blurred Lines: How FinTech is Shaping Financial Services*, PWC GLOB. FINTECH REP., 5-6 (Mar. 2016), https://www.pwc.de/de/newsletter/finanzdienstleistung/assets/insurance-inside-ausgabe-4-maerz-2016.pdf..

[15] Stuart D. Levi, *Blockchains Offer Revolutionary Potential in Fintech and Beyond*, Prac. Insights Comments., 2017 WL 954702

[16] *See, e.g.,* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 3 (2008), https://www.bitcoin.org/bitcoin.pdf.

[17] Mihaela Ulieru, *Blockchain: What it is, how it Really can Change the World*, WORLD ECON. F. (Jun. 23, 2016), https://www.weforum.org/agenda/2016/06/the-blockchain..

[18] Olver Cann, *These are the Top 10 Emerging Technologies of 2016*, WORLD ECON. F. (Jun. 23, 2016), https://www.weforum.org/agenda/2016/06/top-10-emerging-technologies-2016/.

[19] Mihaela Ulieru, *Blockchain: What it is, how it Really can Change the World*, WORLD ECON. F. (Jun. 23, 2016), https://www.weforum.org/agenda/2016/06/the-blockchain.

[20] Leah McGrath Goodman, *Bitcoin is Being Monitored by an Increasingly Wary U.S. Government*, NEWSWEEK (Dec. 15, 2016), http://www.newsweek.com/2016/12/23/virtual-currencies-bitcoin-being-monitored-us-government-532063.html (discussing how Blockchain presents challenges and dangers to the U.S. Government's ability fight terrorism and other enemies); *Id.*

[21] *Blurred Lines: How FinTech is Shaping Financial Services,* PWC GLOB. FINTECH REP., 16 (Mar. 2016), https://www.pwc.de/de/newsletter/finanzdienstleistung/assets/insurance-inside-ausgabe-4-maerz-2016.pdf.

Blockchain, 15% were very familiar with Blockchain, and 0% were extremely familiar with Blockchain[22]. Additionally, Bitcoin, the cryptocurrency for which Blockchain was developed, shares a similar surreptitious past[23]. Satoshi Nakamoto, the developer of Bitcoin and Blockchain, never communicated with the public by phone or in-person when presenting his technology[24]. He exclusively used email[25]. After developing both technologies in 2008 and releasing them in early 2009, Satoshi Nakamoto cut off all communications with the public in 2011 and has not been heard from since[26]. It is unknown if Satoshi Nakamoto is even a real person or if that name is an alias for one or many different programmers behind the development Bitcoin[27].

Satoshi Nakamoto never filed a patent application for Bitcoin or Blockchain[28]. Various computer programmers have either claimed to be Satoshi Nakamoto or have been implicated as Satoshi Nakamoto; however, no person has produced evidence credibly substantiating their claim to authoring the technology[29]. While no foundational Blockchain patent exists, tech startups and financial institutions are launching Blockchain-derived technologies[30]. These companies are in business to make profits and want to exclude others from using their technology[31].

In order to be awarded patent protection, an invention must be patent-eligible[32]. Patent eligibility is governed by the provisions of 35 U.S.C. § 101[33]. Bitcoin and Blockchain are considered business methods and software patents[34]. While business methods and software once enjoyed broad patent-eligibility[35], the Supreme Court's

---

[22] *Id.*
[23] Nathaniel Popper, *Decoding the Enigma of Satoshi Nakamoto and the Birth of Bitcoin*, N.Y. TIMES (May 15, 2015).
[24] *Id.*
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] Bailey Reutzel, *The Looming War for Blockchain* Patents, COINDESK (September, 24 2016), http://www.coindesk.com/looming-war-blockchain-patents/.
[29] *Id.*; John Kelleher, *Who Is Satoshi Nakamoto, Mysterious Bitcoin Founder?*, INVESTOPEDIA, http://www.investopedia.com/articles/general/032614/who-satoshi-nakamoto-mysteriousbitcoin-founder.asp.
[30] Bailey Reutzel, *The Looming War for Blockchain Patents*, COINDESK (September, 24 2016), http://www.coindesk.com/looming-war-blockchain-patents/.
[31] *Id.*
[32] Christopher Cuneo, *Does Not Compute: Is Software Patentable Anymore?*, 56 ADVOCATE 37 (2013).
[33] *Id.*
[34] Bailey Reutzel, *The Looming War for Blockchain Patents*, COINDESK (Sep. 24, 2016), http://www.coindesk.com/looming-war-blockchain-patents/.
[35] *State Street Bank & Trust Co. v. Signature Fin. Grp., Inc.,* 149 F.3d 1368, 1377 (Fed. Cir. 1998).

decision in *Alice v. CLS Bank*[36] significantly restricted Section 101[37]. In dissent, one Federal Circuit Judge proclaimed *CLS Bank* "is the death of hundreds of thousands of patents, including all business method, financial system, and software patents as well as many computer implemented and telecommunications patents."[38] Despite this, Blockchain should be patent-eligible. Patent protection establishes a financial reward for creation, creates property rights, and ensures that knowledge is distributed openly for societal benefit[39]. Blockchain is a specific improvement to computer technology, and a Blockchain patent would promote innovation.

This note will discuss the patent eligibility of Blockchain in light of the holding in *CLS Bank*. Section I will discuss the technology behind Bitcoin and Blockchain. It will discuss what Bitcoin is, why Bitcoin was developed, and how Bitcoin functions. This section will then discuss what Blockchain is, why Blockchain was developed, and how Blockchain functions. This section will conclude by discussing what a Blockchain patent would look like. Section II will discuss the patent-eligibility of business methods and software patents under *CLS Bank*. This section will discuss pre-*CLS Bank* patent-eligibility and post-*CLS Bank* patent-eligibility. Section III will apply the *CLS Bank* framework for patent-eligibility to Blockchain, and determine if Blockchain and Blockchain derived technologies are patent-eligible. Section IV will discuss the regulatory implications of a Blockchain patent.

I. BACKGROUND

Bitcoin is a decentralized digital cryptocurrency that relies on peer-to-peer networking and cryptography to function, and is not backed by any government or central issuing authority[40]. Bitcoin was developed by a programmer, known as Satoshi Nakamoto, who sought to eliminate the need for trusted third-party intermediaries to complete online transactions[41]. In most transactions over the

[36] *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2352 (2014).
[37] *See, e.g., Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed Cir. 2014) (holding that a method of generating a device profile that describes properties in a digital image reproduction is not patent eligible under *Alice*); *Planet Bingo, LLC v. VKGS, LLC,* 576 F. App'x 1005, 1009 (Fed. Cir. 2014) (holding that a computer-aided method & system for managing the game of bingo is not patent eligible under *Alice*); *buySAFE, Inc. v. Google, Inc*., 765 F.3d 1350, 1355 (Fed. Cir. 2014) (holding that a safe transaction service provider for online commercial transactions with guaranty services that binds the transaction is not patent eligible under *Alice*).
[38] *CLS Bank Int'l v. Alice Corp. Pty*., 717 F.3d 1269, 1313 (Fed. Cir. 2013), aff'd, 134 S.Ct. 2347 (2014).
[39] World Intellectual Property Organization, *What is Intellectual Property?* 3-7 (2004), http://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf.
[40] Jerry Brito & Andrea Castillo, *Bitcoin A Primer for Policymakers* (Mercatus Center at George Mason University 2013).
[41] *Id.*

internet, services like PayPal, American Express, or a banking institution are needed to complete the transaction[42]. The intermediary operates as a ledger for the account holder, deducting the amount needed to complete the transaction from the account holders account and transmitting it to the other parties' accounts[43].

Prior to Bitcoin, trust was a major problem for earlier cryptocurrencies[44]. Trusted third-party intermediaries function as a money-clearing service and prevent account holders from spending their funds twice[45]. Early cryptocurrencies depended on a trusted third-party to prevent double-spending and did not offer major advantages over paper currency and traditional services like PayPal[46]. Ownership rights would be broadcasted to a central authority to verify the currency's authenticity and prevent double-spending, and new currency would be issued by the central authority[47]. While this approach solved the double-spending problem, it opened up concerns about hacking, expense, and limited privacy[48].

A. BITCOIN

Satoshi Nakamoto released Bitcoin in 2009[49], and designed the technology to solve the problems seen in earlier cryptocurrencies[50]. Bitcoin does not utilize a

---

[42] *Id.*
[43] *Id.*
[44] *Id.*
[45] *Id.* at 3-4.
[46] *Id.* at 4; *see, e.g.,* David Chaum, *Blind Signatures for Untraceable Payment, Advances in Cryptology Proceedings of Crypto* 199, 200 (1998), http://www.hit.bme.hu/~buttyan/courses/BMEVIHIM219/2009/Chaum.BlindSigForPayment.1982.PDF (Use of a trusted server to broadcast account transactions); Wei Dai, *B-Money, An Anonymous, Distributed Electronic Cash System*, http://www.weidai.com/bmoney.txt (Use of many trusted servers to broadcast currency ownership); Nick Szabo, *Secured Property Titles with Owner Authority*, NAKAMOTO INSTITUTE (1998), http://nakamotoinstitute.org/secure-property-titles/ (Use of many trusted servers to broadcast currency ownership).
[47] *Id.*
[48] *See, e.g.,* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 1-2 (2008), https://www.bitcoin.org/bitcoin.pdf; Andre Saraiva, Bruno Almeida, Samuel Barroso, *Secured Transactions without Mining or Central Authority*, 2 (May 2015), https://courses.csail.mit.edu/6.857/2015/files/saraiva-almeidda-barroso.pdf (discussion on how byzantine agreement based cryptocurrencies may suffer Sybil attacks).
[49] Nathaniel Popper, *Decoding the Enigma of Satoshi Nakamoto and the Birth of Bitcoin*, N.Y. TIMES (May 15, 2015).
[50] *See* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 1-2 (2008), https://www.bitcoin.org/bitcoin.pdf (discussing the advantages to bitcoin); *See, e.g.,* Julie Pitta, *Requiem for a Bright Idea*, FORBES (Nov. 1, 1999), http://www.forbes.com/forbes/1999/1101/6411390a.html (discussing the failure of DigiCash cryptocurrency); Morgen Peck, *Bitcoin: The Cryptoanarchists' Answer to Cash How Bitcoin brought privacy to electronic transactions*, (May 30, 2012),

trusted third-party to verify currency: instead, Bitcoin verified currency through cryptographic proof-of-work transactions, and time-stamped Blockchain ledgers[51]. Blockchain ledgers register and time-stamp all Bitcoin transactions, and are distributed among Bitcoin users and transmitted via a peer-to-peer network[52]. New Bitcoin transactions are verified against the Blockchain to prevent double-spending and Bitcoin's user base replaces the need for having a trusted intermediary[53].

Public-Key cryptography is used to verify transactions within the Bitcoin network[54]. Cryptography is an encryption technique for transactions and transfers between two people[55]. Public-Key cryptography involves the use of two keys: one private key that is kept secret from other users and one public key that is shared with all users on the Bitcoin network[56]. Transferring information in cryptography from one party to another is informally known as from "Alice to Bob."[57] When transactions occur on the Bitcoin network, Alice transmits a message to the Blockchain that is signed with Alice's private key and includes Bob's public key[58]. The transaction can be verified by looking at Alice's public key and the transfer of ownership from Alice to Bob is recorded, time-stamped, and displayed on the Blockchain[59].

The Bitcoin network uses mining to generate new currency[60]. Since there is no central-issuing authority creating Bitcoins, users are awarded Bitcoins based on the processing power they contribute to the Bitcoin network[61]. Since the Bitcoin network relies on a decentralized Blockchain ledger, the network depends on users contributing processing power to log and verify transactions[62]. Miners work to solve complex math problems that are used to verify transactions, maintain the

---

http://spectrum.ieee.org/computing/software/bitcoin-the-cryptoanarchists-answer-to-cash (discussing the failure of Bit Gold & B-Money).

[51] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 1 (2008), https://www.bitcoin.org/bitcoin.pdf.

[52] Jerry Brito & Andrea Castillo, Bitcoin A Primer for Policymakers 4 (Mercatus Center at George Mason University 2013).

[53] *Id.*

[54] *Id.* at 5.

[55] *See* Sara Robins, *Still Guarding Secrets after Years of Attacks, RSA Earns Accolades for its Founders*, SIAM NEWS, Vol. 36, No. 5, 1 (June 2003).

[56] Jerry Brito & Andrea Castillo, *Bitcoin A Primer for Policymakers* 5 (Mercatus Center at George Mason University 2013).

[57] *See* Robins, *supra* note 55.

[58] *See* Brinto, *supra* note 56.

[59] *Id.*

[60] *Id.*

[61] *Id.*

[62] *Id.*

infrastructure needed to operate the Bitcoin network, and authenticate currency[63]. As users contribute more processing power to the network, the network becomes more secure, and Bitcoin mining becomes harder ensuring that Bitcoins are mined at a predetermined limited rate[64].

A person trying to decrypt and fraudulently steal information in cryptography is informally known as "Eve."[65] In order to complete a public key cryptographic transaction, Bob must use his private key to substantiate the transfer[66]. The only way Eve can decrypt Alice's transfer to Bob is through brute force, which consists of randomly entering passphrases in hopes of decrypt the cryptographic message[67]. As more processing power is contributed to the network, it becomes harder for Eve to attack the network and defraud users of their transacted currency[68]. It is easier for Eve to contribute to the network and mine Bitcoins than it would be for Eve to work towards decrypting Alice and Bob's transaction and defrauding users[69]. This incentive adds more processing power to the network and motivates against attacking the Bitcoin network[70]. Users can freely connect and disconnect from the Bitcoin network, and the network is completely self-sustainable without the need for a trusted third-party intermediary[71].

Since its release in 2009, Bitcoin has been widely adopted and has grown into a global computer technology brand[72]. Sixteen-million Bitcoins have been mined and ten-million people use the Bitcoin network daily[73]. Approximately eighty-million dollars worth of Bitcoins are transferred daily[74]. Currently, one Bitcoin is worth approximately $1,100 as of April 4, 2017 and Bitcoin's 52 week range as of April 4, 2017 is approximately $417 to $1300[75]. A maximum number

---

[63] *Id.* at 6.
[64] *Id.* at 7.
[65] Charles H. Bennett, Gilles Brassard, & Jean-Marc Robert, *Privacy Amplification by Public Discussion*, 17 SIAM J. COMPUT. 210 (Apr. 1988).
[66] *See* Robins*, supra* note 55, at 2-3.
[67] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 6-8 (2008), https://www.bitcoin.org/bitcoin.pdf.
[68] *Id.*
[69] *Id.*
[70] *Id.*
[71] *Id.* at 8.
[72] *See* Kelsey L. Penrose, *Banking on Bitcoin: Applying Anti-Money Laundering and Money Transmitter Laws*, 18 N.C. BANKING INST.529 (2014).
[73] Ritchie S. King, Sam Williams, David Yanofsky, *By reading this article, you're mining bitcoins*, QUARTZ (Dec. 17, 2013), http://qz.com/154877/by-reading-this-page-you-are-mining-bitcoins/.
[74] *Id.*
[75] *See* Investing.com – BTC/USD – Bitcoin US Dollar, https://www.investing.com/currencies/btc-usd (last visited Apr. 4, 2017).

of Bitcoins can be mined in the network: Satoshi Nakamoto designed Bitcoin to produce no more than 21 million Bitcoins, which, based on current trends, will not be reached until 2140[76]. In the paper that first introduced Bitcoin, Nakamoto proposed having transfer fees replace proof-of-work verification when no more Bitcoins can be mined[77].

B. BLOCKCHAIN

One of the key innovations behind Bitcoin is Blockchain[78]. Blockchain is the decentralized peer-to-peer network that maintains a ledge of transactions for Bitcoin[79]. Although Blockchain was developed for Bitcoin, Blockchain technology can be used to record and verify many virtual transactions[80]. Blockchain can be used to process payments, clear and settle transactions, act as a virtual wallet, and function as smart-contract software[81]. Experts consider Blockchain a game-changing technology, and advisors at the professional services company PricewaterHouseCooper have described Blockchain as posing "significant risks to the existing profit pools and business models" of financial services firms[82].

Blockchain's ledger is used to store information about user transactions that are placed through the network.[83] While centralized ledgers depend on a trusted third-party intermediary to manually input information, the Blockchain ledger is virtual and is not housed at a central location[84]. The ledger is stored on all computers connected to the network and a trusted third-party intermediary is not needed to manually input information[85]. When a party broadcasts that it wants to transfer

---

[76] *See* Brito, *supra* note 56, at 7.

[77] *See* Nakamoto, *supra* note 67, at 4.

[78] *See Blockchain Disrupting the Financial Services Industry?*, DELOITTE, 2 (2015), https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_Cons_Blockchain_1015.pdf.

[79] Shawn S. Amuial, Josias N. Dewey, & Jeffrey R. Seul, *The Blockchain: A Guide for Legal & Business Professionals* § 1:2 (2016).

[80] *See* Deloitte, *supra* note 79.

[81] *Id.* at 4 (discussing how the characteristics of blockchain could lead to potential advantages in the financial services and banking sectors); Joshua Ashley Klayman, *The (Heart)beat Has Sounded: The World Economic Forum Places Blockchain Front and Center*, 22 No. 14 WESTLAW JOURNAL BANK & LENDING LIABILITY 2 (2016). (discussing how blockchain technology can be implemented).

[82] *Blurred Lines: How FinTech is Shaping Financial Services*, PWC GLOBAL FINTECH REPORT, 16 (Mar. 2016), http://www.pwc.com/gx/en/industries/financial-services/fintech-survey/report.html.

[83] Shawn S. Amuial, Josias N. Dewey, & Jeffrey R. Seul, *The Blockchain: A Guide for Legal & Business Professionals* § 1:2 (2016).

[84] *Id.*

[85] *Id.*

information to another user ("Alice to Bob"), all users connected to the network ("Miners") work to verify that the transaction is valid (not an "*Eve*" transaction)[86]. If a user looks at a Blockchain ledger, through the use of time stamping he could trace the ledger back to the first transaction made on the network[87].

After a transaction has been completed and verified, it is memorialized into a block on the Blockchain ledger[88]. A block stores information about completed transactions and includes all aggregated transactions that occurred after the preceding block was created[89]. By aggregating information into individual blocks instead of one continuous ledger, each transaction can be linked based on when it occurred and can create a chain that traces back to the first transaction[90]. This ledger, based on a chain of blocks, offers increased network security and makes it extremely difficult for users to alter prior ledger entries on the network to defraud other users[91]. Eventually, transactions are bundled up, broadcasted through the network, and are referenced by the subsequent block[92].

Governments have proposed using Blockchain to transmit budgets and spending reports to taxpayers[93]. Blockchain-based smart contracts have been proposed as ways to distribute dividends, execute real estate purchase agreements, execute sales of energy, and improve supply chain logistics[94]. The Toronto Stock Exchange is exploring ways to use Blockchain technology in the future[95]. Delaware is considering allowing corporations to distribute their shares via Blockchain[96]. BNY Mellon, a company that specializes in settlement solutions[97], has an internal

[86] *Id.*
[87] *Id.*
[88] *Id.*
[89] *Id.*
[90] *Id.*
[91] *Id.*
[92] *Id.*
[93] *Blockchain Disrupting the Financial Services Industry?*, DELOITTE, 5 (2015), https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_Cons_Blockchain_1015.pdf. (discussing a mayoral candidate's plan to implement blockchain).
[94] Joshua Ashley Klayman, *The (Heart)beat Has Sounded: The World Economic Forum Places Blockchain Front and Center*, 22 No. 14 WESTLAW JOURNAL BANK & LENDING LIABILITY 2 (2016) (discussing smart contracts).
[95] Justin O'Connell, *Toronto Stock Exchange Executive Anthony Di Iorio Wants to Turn Canada Into a Blockchain Powerhouse*, BITCOIN MAGAZINE (Apr. 1, 2016), https://bitcoinmagazine.com/articles/toronto-stock-exchange-executive-anthony-di-iorio-wants-to-turn-canada-into-a-blockchain-powerhouse-1459528603.
[96] Joshua Ashley Klayman, *The (Heart)beat Has Sounded: The World Economic Forum Places Blockchain Front and Center*, 22 No. 14 WESTLAW JOURNAL BANK & LENDING LIABILITY 2 (2016) (discussing Delaware's proposed Blockchain initiative).
[97] *See* BNY Mellon, *Clearing Custody and Settlement*, https://www.bnymellon.com/us/en/what-we-do/investment-services/pershing-clearing-services/clearing-custody-and-settlement.jsp (last visited Nov. 13, 2016) (discussing how BNY Mellon is a market leader in settlement solutions).

team exploring the implementation of Blockchain[98]. Other financial firms have teamed up to develop common Blockchain technology[99]. While it remains to be seen which strategy for Blockchain will work best, an estimated 80% of banks will be developing Blockchain technology in 2017[100]. Blockchain is here to stay, and it is very important for the financial industry to understand the technology and know if Blockchain derived technologies will be afforded patent-protection[101].

C. A BLOCKCHAIN PATENT

Satoshi Nakamoto never filed a patent application for Bitcoin or the Blockchain technology that powered it[102]. Although Nakamoto never filed a patent application for Blockchain, a number of well-known financial firms are filing patents on the technology[103]. As companies file patents on a variety of Blockchain technologies and gear up to defend their intellectual property rights against others in the Blockchain space, it is unclear if a court would find Blockchain patent-eligible subject matter[104]. A recent Blockchain patent filed by Bank of America for a transaction validation system is claimed as follows[105]:

> A cryptocurrency validation system, comprising: a memory operable to store a customer profile associated with a customer; one or more processors communicatively coupled to the memory and operable to: receive a request from the customer to perform a cryptocurrency transaction with a third party; calculate a risk score for the cryptocurrency transaction; determine a number of required validations to confirm the cryptocurrency transaction based at least

[98] *Blockchain Disrupting the Financial Services Industry?*, DELOITTE, 6 (2015), https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_Cons_Blockchain_1015.pdf.
[99] *Id.*
[100] James Temperton, *Bitcoin might fail but the Blockchain is here to stay*, WIRED, (Nov. 24, 2014), http://www.wired.co.uk/article/bitcoin-myspace-cryptocurrency-blockchain (discussing long-term viability of blockchain technology despite currency fragility).
[101] James Temperton, *Bitcoin might fail but the Blockchain is here to stay*, WIRED (Nov. 24, 2014), http://www.wired.co.uk/article/bitcoin-myspace-cryptocurrency-blockchain.
[102] Ira Schaefer & Ted Mlynar, *The Bitcoin Patent – Only A Matter of Time?*, COINDESk (Aug. 25, 2016), http://www.coindesk.com/bitcoin-patent-matter-of-time/.
[103] Olga Kharif, *Big Banks Are Stocking Up on Blockchain Patents*, BLOOMBERGTECHNOLOGY (Dec. 21, 2016), https://www.bloomberg.com/news/articles/2016-12-21/who-owns-blockchain-goldman-bofa-amass-patents-for-coming-wars.
[104] Bailey Reutzel, *The Looming War for Blockchain* Patents, COINDESK (September, 24 2016), http://www.coindesk.com/looming-war-blockchain-patents/.
[105] U.S. Patent Application No. 14/305,783, at [37], Publication No. 20150363782 (published Dec. 17, 2005).

> in part upon the risk score; receive a number of validations from a plurality of miners; compare the number of received validations to the number of required validations; and determine whether the number of received validations complies with the number of required validations. . . .

This note adopts this proposed claim language to describe Blockchain and to analyze it for patent-eligibility. A Blockchain patent will incentivize investors to continue to invest in Blockchain and reward creativity. Patent-eligibility is determined under 35 U.S.C. § 101.[106] The Supreme Court restricted Section 101 in *Alice v. CLS Bank*[107]. To determine if Blockchain derived technology is patent-eligible, lawyers must examine the patent-eligibility of business methods and software patents.

II. THE PATENT-ELIGIBILITY OF BUSINESS METHODS AND SOFTWARE PATENTS UNDER *CLS BANK*

Title 35, Section 101 of the United States Code reserves patent eligibility for any man-made process, machine, manufacture, or composition of matter.[108] Laws of nature, natural phenomena, and abstract ideas are patent-ineligible subject matter under Section 101 and deemed judicially-created exceptions[109]. There is a difference between eligibility and patentability[110]. Eligibility is a low barrier to overcome: to be patent-eligible, the invention must simply be entitled to patent-protection[111]. By contrast, patentability requires the given patent be new, non-obvious, and useful: It also requires that the invention satisfy all statutory requirements for obtaining a patent[112]. While abstract ideas are not deemed patent-

---

[106] *Diamond v. Chakrabarty*, 100 S.Ct. 2204, 2206 (1980) (discussing test for patent-eligibility).
[107] Christopher Cuneo, *Does Not Compute: Is Software Patentable Anymore?*, 56 ADVOC. 37 (2013) (complexity in software patent eligibility).
[108] 35 U.S.C. § 101 (2012).
[109] Magnus Gan, *Before Mayo & After Alice: The Changing Concept of Abstract Ideas*, 22 MICH TELECOMM. & TECH. L. REV. 287, 291 (2016). ("Three judicial exceptions were thus created, and patents directed to laws of nature, physical phenomena, or abstract ideas fell outside the statutorily permissible subject matter for patents
(i.e. process, machine, manufacture, and composition of matter").
[110] Jeffrey A. Lefstin, *The Three Faces of Prometheus: A Post-Alice Jurisprudence of Abstraction*, 16 N.C. J. L. & TECH. 647, 649 (2015) ("Qualification as patent-eligible subject matter is the beginning, not the end of the question of patentability; even if an invention is patent-eligible, it must meet the statutory requirements of utility, novelty, non-obviousness, adequate disclosure, and definite claiming before it can be awarded a patent").
[111] *Id.* at 649.
[112] *Id.*

eligible material, it is also worth noting that at some level, every embodiment of an invention has some level of abstractness attached to it[113]. Too broad of an interpretation of Section 101 could eviscerate patent law and all patents would be deemed abstract[114].

A. PATENT-ELIGIBILITY – PRE-*CLS BANK*

Before *CLS Bank*, inventors could obtain a business method and software patent more easily[115]. In *State Street Bank and Trust Co. v. Signature Financial Group, Inc.*[116], the Court of Appeals for the Federal Circuit held that a system of conducting business could be patent-eligible[117]. In *State Street*, Signature Financial obtained a patent for a data processing system[118]. The system performed complex calculations to value investments held within a mutual fund[119]. State Street attempted to license this technology from Signature Financial.[120] After negotiations failed, State Street moved to invalidate Signature Financial's patent, claiming that the patent did not cover eligible subject matter under Section 101[121]. The Federal Circuit recognized that abstract ideas are not patent-eligible under Section 101[122]. However, the Court concluded that while mathematical algorithms or calculations on their own are abstract ideals, they may be patent-eligible when applied practically to produce "useful, concrete, and tangible results"[123]. The Federal Circuit held that a series of mathematical calculations undertaken by a computer to transform discrete share data into a final share price was patent-eligible. The court also held that claims covering business methods should be assessed with the same standard of patent eligibility as all other processes and methods[124]. The broadness of this holding raised concerns that innocent businesses might become liable for innocently using patented business methods they assumed could not be awarded patent protection[125].

---

[113] Gan, *supra* note 109, at 291.
[114] *Id.* at 290-91.
[115] Chad King, *Abort, Retry, Fail: Protection for Software-Related Inventions in the Wake of State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 85 CORNELL L. REV. 1118 (2000).
[116] *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.,* 149 F.3d 1368 (Fed. Cir. 1998).
[117] *Id.* at 1375.
[118] *Id.* at 1370.
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] *Id.* at 1374.
[123] *Id.* at 1373-74.
[124] *Id.*
[125] *Bilski v. Kappos*, 130 S.Ct. 3218, 3250 (2010).

After *State Street*, the United States Patent and Trademark Office ("**USPTO**") began issuing more business method patents[126]. The USPTO adopted stricter guidelines following *State Street*, making it more difficult to invalidate patents covering business methods and software[127]. After a rise in business methods and software patents[128], the Supreme Court revisited *State Street* and patent eligibility in *Bilski v. Kappos*[129]. In *Bilski*, the Supreme Court overruled the Federal Circuit's interpretation of patent-eligibility for business methods and software[130].

Prior to *Bilski*, the Federal Circuit utilized the "machine-or-transformation" test for determining if business methods and software were patent-eligible[131]. The machine-or-transformation test states that a process claim is narrow enough for patent eligibility if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing."[132] In *Bilski*, Bilski, the inventor, applied for a patent that claimed the process of protecting against risk of purchasing energy commodities[133]. The USPTO rejected the patent and claimed the subject matter that was not patent-eligible, and Bilski appealed[134]. The Federal Circuit heard the case *en banc* and affirmed, and Bilski appealed again to the Supreme Court[135]. The Supreme Court held that (1) contrary to the Federal Circuit's holding in *In Re Bilski*, the machine-or-transformation test is not the only method for determining business method and software eligibility; and (2) that business methods are not *per se* excluded from being considered as patent-eligible processes[136]. The Court additionally ruled that the Federal Circuit wrongfully applied 35 U.S.C. § 101 when deciding *State Street*[137], and clarified that the machine-or-transformation test is not the sole test for eligibility[138]. Rather, that test is a useful and important clue to patent eligibility[139]. The Court concluded that Bilski's claimed invention was not patent-eligible because the invention was an

[126] King, *supra* note 115, at 1156.
[127] *Id.* at 1151.
[128] *See* Gene Quinn, *1998: Federal Circuit Says Yes to Business Methods*, IPWATCHDOG, Dec. 12, 2014, http://www.ipwatchdog.com/2014/12/12/1998-federal-circuit-says-yes-to-business-methods/id=52416/.
[129] *Bilski* , 130 S.Ct.. at 3250.
[130] *Id.* at 3220.
[131] *Id.* at 3226-27.
[132] *Id.* at 3224.
[133] *Id.* at 3223.
[134] *Id.* at 3224.
[135] *In re Bilski*, 545 F.3d 943, 966 (Fed. Cir. 2008), aff'd but criticized sub nom. *Bilski v. Kappos*, 130 S.Ct. 3218 (2010).
[136] *Bilski v. Kappos*, 130 S.Ct. 3218, 3227-29 (2010).
[137] *Id.* at 3231.
[138] *Id*. at 3227.
[139] *Id.* at 3227.

abstract idea and not a patent-eligible process[140]. In a concurring opinion, Justice Stevens concluded that *Bilski* only clarified *State Street*'s confusion[141]. Prior to *State Street*, business-method patents were widely excluded from patent-eligibility and they are still excluded today[142].

After deciding *Bilski*, the Supreme Court adopted a two-prong test for determining patent eligibility for biomedical and life-science patents[143]. In *Mayo Collaborative Services v. Prometheus Labs, Inc.*, Prometheus was the sole licensee of a patent covering a method for determining the proper dosage of the drug Thiopurine[144]. A diagnostic test measured metabolite levels in the patient's blood and a doctor calculated if the Thiopurine dosage was too low or too high[145]. Mayo purchased a diagnostic test manufactured by Prometheus, reverse-engineered Prometheus' test, and then announced its intention to sell its own test for determining the proper dosage of Thiopurine[146]. Prometheus filed suit and Mayo asserted the patent was invalid because it covered patent-ineligible subject matter[147]. The Supreme Court ruled that determining patent-eligibility involved a two-step investigation[148]. First, the court must determine if the claim is directed toward one of the three judicially created exceptions to patent-eligible subject matter (laws of nature, natural phenomena, or abstract ideas)[149]. Second, if the claim is directed towards a judicial exception, the court must determine if enough was added to show inventive concept[150]. The Supreme Court held that a claim will not be patent-eligible if it informs the relevant audience about certain laws of nature[151]. Furthermore, if the additional steps consist of well-understood, routine, conventional activity already engaged in by the audience, an invention will be deemed patent-ineligible[152]. Prometheus' Thiopurine patent was found to not be patent-eligible[153].

In *Bancorp Services, LLC v. Sun Life Assurance Co.*,[154] the Federal Circuit applied *Bilski* and found that Bankcorp's patent on a method for managing a life

[140] *Id.* at 3231.
[141] *Id.* at 3250-51.
[142] *Id.* at 3229.
[143] *Mayo Collaborative Servs. v. Prometheus Labs., Inc.,* 132 S.Ct. 1289, 1296-97 (2012).
[144] *Id.* at 1290.
[145] *Id.* at 1290-91.
[146] *Id.*
[147] *Id.* at 1291.
[148] *Id.* at 1296-97.
[149] *Id.* at 1293, 96-97.
[150] *Id.* at 1297.
[151] *Id.* at 1305.
[152] *Id.*
[153] *Id.*
[154] *Bancorp Servs., L.L.C. v. Sun Life Assur. Co. of Canada* (U.S.), 687 F.3d 1266, 1272 (Fed. Cir. 2012).

insurance policy on behalf of its policy holder was patent-ineligible[155]. Although the Bankcorp patent was similar to the eligible patent in *State Street*, the Federal Circuit held that Bancorp's claims were not limited to being performed on a computer; the use of a computer was not integral to carrying out the claimed invention; and that a person could make the calculations or computational on his own[156]. Thus, Bankcorp's invention was a patent-ineligible abstract idea[157]. While the Federal Circuit cited to *Mayo Collaborative Servs. v. Prometheus Labs, Inc.*, it did not apply the *Mayo* framework for determining patent-eligibility when ruling on the case[158].

In *Alice Corp. v. CLS Bank International*[159], the Supreme Court reexamined patent eligibility for business methods and software patents[160]. Alice was the assignee of several software patents that used a computer system as a third-party intermediary for calculating settlement risk[161]. This practice was well-known in the business world prior to the assigned Alice patents[162]. CLS Bank brought suit, seeking to invalidate Alice's patent under Section 101[163]. The U.S. District Court for the District of Columbia held that Alice's invention was a patent-ineligible abstract idea[164], and a divided panel of the Federal Circuit reversed, holding that it was not evident that Alice's claims were directed toward abstract ideas[165]. The Federal Circuit granted a rehearing en banc, vacating its own previous decision[166], and Alice appealed to the Supreme Court[167]. The Supreme Court held that patent eligibility for business methods and software patents should be determined using the same framework articulated in *Mayo*[168]. First the court determines whether a challenged claim is directed to the three judicial exceptions to patent-eligible subject matter (laws of nature, natural phenomena, abstract ideas)[169]. Improvements

[155] *Id.* at 1275-76
[156] *Id.* at 1275.
[157] *Id.* at 1281.
[158] *Id.* at 1275-76, 1279.
[159] 134 S.Ct. 2347 (2014).
[160] *Id.* at 2352.
[161] *Id.* at 2351-52.
[162] *Id.* at 2357-58.
[163] *Id.* at 2353.
[164] *CLS Bank Int'l v. Alice Corp. Pty.,* 768 F. Supp. 221, 253 (D.D.C. 2011), *rev'd,* 685 F.3d 1341 (Fed. Cir. 2012), *reh'g en banc granted*, opinion vacated 484 F. App'x 559 (Fed. Cir. 2012), *and aff'd*, 717 F.3d 1269 (Fed. Cir. 2013), *a'ffd* 134 S.Ct. 2347 (2014).
[165] *CLS Bank Int'l v. Alice Corp. Pty.,* 685 F.3d 1341, 1361 (Fed. Cir. 2012), *reh'g en banc granted*, opinion vacated 484 F. App'x 559 (Fed. Cir. 2013).
[166] *CLS Bank Int'l v. Alice Corp. Pty.,* 717 F.3d 1639, 1313 (Fed Cir. 2013), *aff'd*, 134 S.Ct. 2347 (2014).
[167] *CLS Bank Int'l v. Alice Corp. Pty.*, 134 S.Ct. 2347, 2353 (2014).
[168] *Id.* at 2354-55.
[169] *Id.* at 2355.

designed to solve technological problems in the industry are not considered abstract ideas, while the generic implementation of a technology through a computer is considered an abstract idea[170]. If the claim is not directed at an abstract idea, then the claim passes Section 101 scrutiny[171]. If, however, a claim is directed to one of these three exceptions, that is not necessarily fatal[172]. A claim can still be deemed patent-eligible if the patent applicant can show proof of an inventive concept[173]. The court considers the elements of the claims, both individually and in combination, to see if the claims are "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."[174] In *CLS Bank*, the Supreme Court held the patents were not directed to eligible subject matter because the claims were based on abstract ideas and merely required the generic implementation of a computer[175].

B. PATENT-ELIGIBILITY – POST-*CLS BANK*

After *CLS Bank*, Section 101 patent-eligibility has been a death sentence for business method and software patents during patent-litigation[176]. Recent court decisions after *CLS Bank* cast doubt on the patent-eligibility of business methods and software[177]. There are two ways that business methods and software patents can overcome *CLS Bank* patent-eligibility analysis; first, if the patent's claims add enough to the abstract idea to show significant inventive concept, or second, if the claims themselves are not considered patent-ineligible subject matter[178]. Under the significant inventive concept analysis the court looks for an element or combination

[170] *Id*. at 2358.
[171] *Id*.
[172] *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1284 (2012).
[173] *Id.*
[174] *Id.*
[175] *Id.* at 2360.
[176] Christopher Cuneo, *Does Not Compute: Is Software Patentable Anymore?*, 56 Advocate 37 (2013); *see, e.g., Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed Cir. 2014) (holding that a method of generating a device profile that describes properties in a digital image reproduction is not patent eligible under *Alice*); *Planet Bingo, LLC v. VKGS, LLC, 576 F*. App'x 1005, 1009 (Fed. Cir. 2014) (holding that a computer-aided method & system for managing the game of bingo is not patent eligible under *Alice*); *buySAFE, Inc. v. Google, Inc*., 765 F.3d 1350, 1355 (Fed. Cir. 2014) (holding that a safe transaction service provider for online commercial transactions with guaranty services that binds the transaction is not patent eligible under *Alice*); *Ultramericial, Inc. v. Hulu, LLC,* 772 F.3d 709, 723 (Fed. Cir. 2014) (holding that a method to distribute products over the internet via a facilitator is not patent eligible).
[177] Christopher Cuneo, *Does Not Compute: Is Software Patentable Anymore?*, 56 ADVOCATE 37 (2013).
[178] Fabio E. Marino & Teri H. P. Nguyen, *From Alappat to Alice: The Evolution of Software Patents*, 9 HASTINGS SCI. & TECH. L.J. 1, 20, 22 (2017).

of elements in the claim that in practice would amount to significantly more than the patent-ineligible subject matter itself[179]. While courts have recognized the line separating patent-eligibility from patent-ineligibility is not always clear[180], courts look to see if the invention provides something more beyond mere "well-understood, routine, conventional activity."[181] The invention cannot recite claims that are already well-known and already utilized by those in the field[182]. For claims rooted in computer technology, the invention must work to overcome a problem specifically arising in that area of computer technology[183]. Simply taking an abstract idea and implementing it onto a computer will not show inventive concept[184].

In determining whether patent claims are considered patent-ineligible subject matter, courts look to see if the patent claim is directed toward an abstract idea or directed to a specific improvement in the prior art[185]. Under this analysis, business methods and software patent claims that (1) purport to improve the function of a computer or business method itself, (2) do more than simply instruct the practitioner to implement an abstract idea onto a generic computer, and (3) offer a meaningful limit beyond generally linking the use of a particular method onto a particular technological environment will likely be found patent-eligible[186]. While this analysis requires the patent to also include enough features to ensure that the patent is more than a drafting effort designed to capture an abstract idea, the court looks to the plain focus of the claims to see if the invention is patent-eligible[187]. An invention not directed towards an abstract idea will pass the first *CLS Bank* step and be found patent-eligible[188].

In *Enfish, LLC v. Microsoft Corp.*[189], the Federal Circuit applied the first *CLS Bank* step to several patents related to a self-referential database and found patent eligibility[190]. Enfish obtained a patent that claimed an innovative logical model for a computer database where, contrary to conventional models, the patented model included all data entries in a single table[191]. Microsoft used a computer database similar to Enfish's model, and Enfish sued Microsoft for patent

[179] *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1255 (Fed Cir. 2014).
[180] *Id.* at 1255.
[181] *Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1376 (Fed. Cir. 2016).
[182] *Id.* at 1377.
[183] *DDR Holdings, LLC v. Hotels.com, L.P.,* 773 F.3d 1245, 1257 (Fed Cir. 2014).
[184] *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2358 (2014).
[185] *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016)
[186] Fabio E. Marino & Teri H. P. Nguyen, *From Alappat to Alice: The Evolution of Software Patents*, 9 HASTINGS SCI. & TECH. L.J. 1, 22-25 (2017).
[187] Jasper L. Tran, *Two Years After Alice v. CLS Bank*, 98 J. PAT & TRADEMARK OFF. SOC'Y 354, 364-65 (2016).
[188] *Id* at 364.
[189] 822 F.3d 1327, 1346 (Fed. Cir. 2016).
[190] *Enfish, LLC* at 1334.
[191] *Id.* at 1330.

infringement[192]. The District Court for the Central District of California found that Enfish directed its patent towards patent-ineligible subject matter and was thus invalid[193]. Enfish appealed.[194] The Federal Circuit found that Enfish did not direct its patent towards patent-ineligible abstract ideas within the meaning of *CLS Bank*[195]. Rather, the claims at issue "[were] directed to a specific improvement to the way computers operate, embodied in the self-referential table."[196] In determining that Enfish did not direct its patent towards patent-ineligible abstract ideas, the Federal Circuit questioned whether the claims were directed to a specific implementation of a solution to a problem in the art or directed to an abstract idea[197]. The Federal Circuit recognized that there may be certain situations where it is a close call about whether to classify claims as abstract ideas, stating that "[i]n such cases, an analysis of whether there are arguably concrete improvements in the recited computer technology could take place under step two."[198] However, Enfish's patent was not one of those cases, and the Federal Circuit held that the patent claims were directed to specific improvements to computer technology and thus were patent-eligible under the first *CLS Bank* step[199]. The Federal Circuit concluded there was no need to proceed to the second step of the analysis[200].

In *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*[201], the Federal Circuit applied the second *CLS Bank* step to a patent claiming a system for filtering internet content[202]. BASCOM held a patent on a system that filtered the type of information that could be received over the internet from an external server, while granting individual users the ability to customize how content was filtered locally on their own computers[203]. BASCOM sued AT&T for infringement, and AT&T asserted BASCOM's patent was directed at an abstract idea that was not patent-eligible under *CLS Bank*[204]. The District Court for the Northern District of Texas agreed with AT&T finding that BASCOM's invention was not patent-

[192] *Id.* at 1333
[193] *Id.* at 1334,1349
[194] *Id*. at 1330
[195] *Id.* at 1346.
[196] *Id.* at 1336.
[197] *Id.* at 1338.
[198] *Id.* at 1339.
[199] *Id.* at 1338-39.
[200] *Id.* at 1339; *see also Thales Visionix Inc. v. United States* 850 F.3d 1343, 1344,(Fed. Cir. 2017) (holding that "an inertial tracking system for tracking the motion of an object relative to a moving reference frame" was not an abstract idea and thus patent eligible under the first *CLS Bank* step).
[201] *Bascom Global Internet Serv. v. AT&T Mobility LLC*, 827 F.3d 1341, 1343-1344 (Fed. Cir. 2016).
[202] *Id.* at 1346
[203] *Id.*
[204] *Id.* at 1346.

eligible[205], and BASCOM appealed[206]. The Federal Circuit recognized that BASCOM's patent was a close-call case[207]. While the invention improved on previous internet-filtering technology, the Federal Circuit recognized that the BASCOM-directed patent claims were directed toward a method of organizing human activity[208]. The Federal Circuit determined that BASCOM did direct the patent towards an abstract idea, and applied the second *CLS Bank* step to the patent[209]. The limitations of BASCOM's patent claim, when taken individually, recited generic computer networks and internet components: however, when the patent was viewed as a whole, as a matter of law, it could not be defined as "well-understood, routine, and conventional."[210] BASCOM's patent claimed a technological-based solution to a problem existing in internet filtering-systems[211]. The Federal Circuit found inventive concept, and vacated the District Court's ruling[212].

III. BLOCKCHAIN IS PATENT-ELIGIBLE IN LIGHT OF *CLS BANK*

In determining whether Blockchain is patent-eligible, courts will apply the *CLS Bank* framework[213]. Under *CLS Bank*, in order for business methods and software to be patent-eligible, the claims must (1) not be directed at an abstract idea and (2) if the claims are directed at an abstract idea, the invention must show inventive concept[214].

A. BLOCKCHAIN IS NOT DIRECTED TOWARDS EXCLUDED SUBJECT MATTER

Applying the first *CLS Bank* step, Blockchain is not directed toward excluded subject matter. The claim is directed to improvements over existing technological processes. When Blockchain was first developed, Satoshi Nakamoto attempted to solve problems with previous cryptocurrencies and the need for a

[205] *Id.* at 1348.
[206] *Id.* at 1347.
[207] *Id.* at 1349.
[208] *Id.* at 1344, 1448.
[209] *Id.* at 1349-50.
[210] *Id.* at 1348-50.
[211] *Id.* at 1352; *see also Amdocs (Isr.) Ltd. V. Openet Telecom, Inc.*, 841 F.3d 1288 (Fed Cir. 2016) (holding patents that claimed a system, method, and computer program for enhancing network usage was patent eligible under the second *CLS Bank* step).
[212] *Id.*
[213] *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2352 (2014).
[214] *Id.*

trusted third-party intermediary[215]. His solution used cryptographic proof-of work transactions, and time stamped Blockchains[216]. Public-key cryptography involves complex mathematical computations and was developed for use over a computer network[217]. Blockchain was designed to offer increased network security and to make it difficult for users to alter prior ledger entries on the network to defraud other users[218]. Blockchain uses a peer-to-peer virtual network and was developed to be used with computer technologies[219]. These inventions are not directed to generic implementations of technology through a computer, they are rooted in computer technology and directed towards specific improvements.

In *Enfish*, the Federal Circuit focused on how Enfish's patent claimed an invention that significantly functioned differently from conventional database technology[220]. Compared to conventional databases, Enfish's database possessed increased flexibility, faster search times, and smaller memory requirements[221]. Enfish's database used complex algorithms and was not generically implemented over a computer[222]. Likewise, Blockchain significantly functions differently from conventional computer-based ledger technologies. It is decentralized and can process discrete secured user transactions[223]. It uses a complex algorithm that eliminates the need for a trusted third-party intermediary and is not an abstract idea implemented generically over a computer[224]. As a result, Satoski Nakamoto's Blockchain would likely pass the first *CLS Bank* step and be found non-abstract subject matter.

---

[215] *See* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 1-2 (2008), https://www.bitcoin.org/bitcoin.pdf. (Discussing the advantages to bitcoin); *See, e.g., Julie Pitta, Requiem for a Bright Idea*, FORBES (Nov. 1, 1999), http://www.forbes.com/forbes/1999/1101/6411390a.html (Discussing the failure of DigiCash cryptocurrency); Morgen Peck, *Bitcoin: The Cryptoanarchists' Answer to Cash How Bitcoin brought privacy to electronic transactions*, (May 30, 2012), http://spectrum.ieee.org/computing/software/bitcoin-the-cryptoanarchists-answer-to-cash. (Discussing the failure of Bit Gold & B-Money).

[216] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 1 (2008), https://www.bitcoin.org/bitcoin.pdf.

[217] Sara Robins, *Still Guarding Secrets after Years of Attacks, RSA Earns Accolades for its Founders*, SIAM NEWS, Vol. 36, No. 5, 1 (June 2003), http://www.msri.org/people/members/sara/articles/rsa.pdf.

[218] Shawn S. Amuial, Josias N. Dewey, & Jeffrey R. Seul, *The Blockchain: A Guide for Legal & Business Professionals* § 1:2 (2016).

[219] *Id.*

[220] *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337 (Fed. Cir. 2016).

[221] *Id.* at 1338.

[222] *Id.*

[223] Shawn S. Amuial, Josias N. Dewey, & Jeffrey R. Seul, *The Blockchain: A Guide for Legal & Business Professionals* § 1:2 (2016).

[224] *Id.*

Like hardware, software can make non-abstract improvements over previous technology without being found inherently abstract[225]. Bank of America's Blockchain patent attempts to do this, describing a way to evaluate risk in a cryptographic transaction[226]. While cryptography was developed for use over a computer network[227], evaluating risk is an economic practice that is common in the financial industry[228]. The claim describes a process to calculate a risk score for a cryptographic transaction and determine how many validations are required to verify that transaction[229]. The first *CLS Bank* step requires more than simply instructing the implementation of an abstract idea over a generic computer[230]. To pass the first *CLS Bank* step, Bank of America should argue that either (1) it's claim is limited to use in a particular technological environment or (2) it's claim is directed specific improvements over previous Blockchain technology[231]. However, if a court were to find that Bank of America's Blockchain patent is directed towards patent-ineligible subject matter, alternatively patent-eligibility could be met through the second *CLS Bank* prong.

B. BLOCKCHAIN DEMONSTRATES AN INVENTIVE CONCEPT

The second *CLS Bank* step determines whether a patent directed toward patent-ineligible subject matter adds enough to that patent-ineligible subject matter to show inventive concept.[232] Inventive concept is demonstrated when the elements in a claim amount to significantly more than the patent-ineligible subject matter[233]. BASCOM's invention harnessed the technical features of network server technology and associated them with individual user accounts[234]. BASCOM's invention had a specific application and claimed a technological based solution to

[225] *Enfish, LLC v. Microsoft Corp*., 822 F.3d 1327 (Fed. Cir. 2016).
[226] U.S. Patent Application No. 14/305,783, at [37], Publication No. 20150363782 (published Dec. 17, 2005).
[227] Sara Robins, Still Guarding Secrets after Years of Attacks, RSA Earns Accolades for its Founders, SIAM NEWS, Vol. 36, No. 5, 1 (June 2003), http://www.msri.org/people/members/sara/articles/rsa.pdf.
[228] *See, e.g.,* Edward Hida, Global risk management survey, DELOITTE UNIVERSITY PRESS (9th ed. 2015), https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/financial-services/ru-global-risk-management-survey-9th-edition.pdf.
[229] U.S. Patent Application No. 14/305,783, at [37], Publication No. 20150363782 (published Dec. 17, 2005).
[230] Fabio E. Marino & Teri H. P. Nguyen, *From Alappat to Alice: The Evolution of Software Patents*, 9 HASTINGS SCI. & TECH. L.J. 1, 22-25 (2017).
[231] *Id.*
[232] *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2355 (2014).
[233] *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1255 (Fed Cir. 2014).
[234] *Id.* at 1350.

a problem with internet-filtering technology[235]. BASCOM was engineered with a specific algorithm for filtering content on the internet[236].

Bank of America's patent describes memory operable for storing customer information, processors communicatively coupled to receive customer requests, and the calculation of risk[237]. While individually these are well-understood, routine, and conventional activities, when viewed as a whole, they go beyond what is considered patent-ineligible subject matter[238]. The claims further describe a process for determining the number of validations required to confirm a cryptocurrency transaction[239]. If this process is not well understood to those in the Blockchain field and overcomes a problem that specifically arises in the Blockchain field, then courts will find Bank of America's invention patent-eligible[240]. Additionally, if Bank of America's patent was specifically engineered to overcome this problem, courts will likely find patent eligibility under the second *CLS Bank* step.

C. DRAFTING A BLOCKCHAIN PATENT

Blockchain is rapidly evolving and many companies are trying to introduce products and platforms developed around Blockchain[241]. Applying *CLS Bank*, a court will first ask if the invention involves patent-eligible subject matter[242]. Scientific truths, mathematical equations, ideas, principles, and motives are not patent-eligible[243]. Blockchain patents should be drafted so that the claims demonstrate sufficient improvements over prior Blockchain technologies[244]. Blockchain patents should not recite claims that are well understood to experts in

---

[235] *Id.* at 1350-51.
[236] *Id.*
[237] U.S. Patent Application No. 14/305,783, at [37], Publication No. 20150363782 (published Dec. 17, 2005).
[238]
[239] *Id.*
[240] *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed Cir. 2014).
[241] *Blockchain Disrupting the Financial Services Industry?*, DELOITTE, 4 (2015), https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_Cons_Blockchain_1015.pdf; *Blurred Lines: How FinTech is Shaping Financial Services*, PWC GLOBAL FINTECH REPORT, 16 (Mar. 2016), http://www.pwc.com/gx/en/advisory-services/FinTech/PwC%20FinTech%20Global%20Report.pdf; http://www.blockchaintechnologies.com/blockchain-smart-contracts#smart-contract-companies
[242] *Alice Corp. Pty. v. CLS Bank Int'l,* 134 S.Ct. 2347, 2352 (2014).
[243] *See* H.R. Rep. No. 71-1129, 6-7 (1930) (explaining why plants, but not certain other types of scientific discoveries, were made to be patentable).
[244] *See TLI Communs. LLC v. AV Auto., L.L.C. (In re TLI Communs. LLC Patent Litig.),* 823 F.3d 607, 612 (Fed. Cir. 2016).

the Blockchain field[245]. Claims-drafters should consider whether experts would see their invention as an improvement or as conventional. If a claim is not directed toward a specific improvement, a Blockchain patent will then require inventive concept[246]. The patent will need to claim sufficient subject matter to show that the invention is more than an abstract idea[247].

A Blockchain patent will be found patent-eligible under the second *CLS Bank* step if it improves the function of a computer itself, applies the judicial exception with a particular machine, transforms a particular article, adds limitation other than what is well understood, or confines the claim to a particular useful application[248]. While there is recognized overlap between the first and second *CLS Bank* steps, it will be harder to prove patent-eligibility for a Blockchain patent if a court applies the second *CLS Bank* step.

IV. THE REGULATORY IMPLICATIONS OF A BLOCKCHAIN PATENT

The White House National Economic Council published a report titled "A Framework for FinTech" that provided federal regulators with a framework for thinking about, engaging with, and assessing the FinTech ecosystem[249]. The framework is based on ten principles that provide insight into how federal regulators should approach FinTech regulation[250]. FinTech, in general, still remains a largely under-regulated industry[251]. Moving forward, government officials aim to regulate FinTech in a way that will maximize innovation while protecting consumers and the financial system[252].

The Office of the Comptroller of Currency ("**OCC**") has proposed granting FinTech charters to financial technology companies[253]. The OCC is in charge of

---

[245] *See BASCOM Glob. Internet Servs., Inc. v. AT&T Mobility LLC,* 827 F.3d 1341, 1347 (Fed. Cir. 2016).
[246] *Alice Corp. Pty. v. CLS Bank Int'l,* 134 S.Ct. 2347, 2352 (2014).
[247] *Id.*
[248] Judith Kim & Scott Schaller, *After Alice: the two-step rule*, LSIPR NEWSLETTER – PATENT ELIGIBILITY (Jun. 2015), http://www.skgf.com/uploads/1378/doc/LSIPR_Jan15_AfterALice.pdf
[249] Adrienne Harris and Alexis Zerden, *A Framework for FinTech*, the White House (Jan. 13, 2017, 6:36 PM), https://obamawhitehouse.archives.gov/blog/2017/01/13/framework-fintech.
[250] *See id.*
[251] Michael B. Soleta, *Office of the Comptroller of the Currency Proposal to Charter Special Purpose National Banks for FinTech Companies* 1, Sullivan & Cromwell LLP, White Paper (Dec. 4 2016), https://www.sullcrom.com/siteFiles/Publications/SC_Publication_OfficeoftheComptrolleroftheCurrencyProposal.pdf.
[252] Adrienne Harris and Alexis Zerden, *A Framework for FinTech*, the White House (Jan. 13, 2017, 6:36 PM), https://obamawhitehouse.archives.gov/blog/2017/01/13/framework-fintech.
[253] Michael B. Soleta, *Office of the Comptroller of the Currency Proposal to Charter Special Purpose National Banks for FinTech Companies*, 1, Sullivan & Cromwell LLP, White Paper (Dec.

regulating national banks and savings associations and has the power to grant charters and promulgate regulations[254]. The OCC has recognized both that FinTech has the power to reshape the financial services industry and that many OCC-regulated institutions are currently involved in financial technology development[255]. To receive a special purpose charter from the OCC, a FinTech company would have to demonstrate that it has effective risk-management, offers consumer protection, and meets certain OCC requirements[256]. The OCC would consider FinTech companies on a case-by-case basis, and would not permit FinTech companies to take deposits[257]. By granting federal charters, the OCC hopes to eliminate some regulatory uncertainty while providing a "consistent application of laws, regulations and guidance."[258]

Other government agencies have explored FinTech regulation[259]. The Financial Stability Oversight Council, Commodity Futures Trading Commission, Federal Reserve, Securities and Exchange Commission, United States Department of Treasury Financial Crimes Enforcement Network, Federal Deposit Insurance Corporation, and the Consumer Financial Protection Bureau have each either explored regulation, expressed a need for regulation, or are currently engaging in discussions with FinTech developers about regulation[260]. Additionally, state

4 2016),
https://www.sullcrom.com/siteFiles/Publications/SC_Publication_OfficeoftheComptrolleroftheCurrencyProposal.pdf.

[254] Financial Regulation Case Study, *OCC Chartering Consideration: Creating a Federal Charter for FinTech Firms*, HARVARD LAW SCHOOL 1-2 (Sep. 2016),
https://wiki.harvard.edu/confluence/download/attachments/204380235/Execution%20Version%20of%20OCC%20FinTech%20Charter%20Problem.pdf.

[255] Conrad G. Bahle & Marija Pecar, *Unblocking the Blockchain: Regulating Distributed Ledger Technology*, 36 NO. 10 FUTURES & DERIVATIVES L. REP. NL 1 (2016).

[256] Michael B. Soleta*, Office of the Comptroller of the Currency Proposal to Charter Special Purpose National Banks for FinTech Companies*,1,7, Sullivan & Cromwell LLP, WHITE PAPER, (Dec. 4 2016),
https://www.sullcrom.com/siteFiles/Publications/SC_Publication_OfficeoftheComptrolleroftheCurrencyProposal.pdf.

[257] *Id.*

[258] Financial Regulation Case Study, *OCC Chartering Consideration: Creating a Federal Charter for FinTech Firms*, HARVARD LAW SCHOOL 25 (Sep. 2016),
https://wiki.harvard.edu/confluence/download/attachments/204380235/Execution%20Version%20of%20OCC%20FinTech%20Charter%20Problem.pdf.

[259] Conrad G. Bahle & Marija Pecar, *Unblocking the Blockchain: Regulating Distributed Ledger Technology*, 36 NO. 10 FUTURES & DERIVATIVES L. REP. NL 1 (2016).

[260] *Id.*; Michael B. Soleta, *Office of the Comptroller of the Currency Proposal to Charter Special Purpose National Banks for FinTech Companie*s, 5, SULLIVAN & CROMWELL LLP, WHITE PAPER (Dec. 4 2016)
https://www.sullcrom.com/siteFiles/Publications/SC_Publication_OfficeoftheComptrolleroftheCurrencyProposal.pdf.

regulators have voiced concerns about FinTech[261]. If the OCC establishes a federal FinTech charter, it will preempt state regulators from regulating FinTech companies[262]. One state regulator argued that "any reliance on a federal FinTech regulatory framework would be irresponsible if it were to ignore the state's … expertise in [the consumer protection] arena."[263] It is still an open question how each regulatory authority will ultimately regulate FinTech and if regulators will work together[264].

If Blockchain is granted patent protection, a consistent national regulatory regime will promote innovation while protecting consumers and the financial system. Innovation is reduced when state and federal regulators promulgate inconsistent regulatory guidelines[265]. By issuing a framework for federal regulatory agencies to follow, the White House National Economics Counsel provides transparency to companies developing Blockchain Technology. Blockchain is national: any user connected to the Blockchain network can access it nationwide via a computer. Location does not matter when accessing the network and there are no limitations on interstate transactions[266].

Blockchain will benefit from a national regulatory scheme. While state regulators have argued states possess expertise in certain regulatory arenas, there are many federal agencies exploring FinTech regulation and Blockchain will benefit from limited state interference. Blockchain developers should engage regulators and act as moderators for Blockchain regulation. They should gather all relevant information and be transparent with regulators about their technology. While transparency may seem counter to Blockchain, which was designed for privacy and security, it will protect the end user, add legitimacy to Blockchain, and benefit all stakeholders involved with the technology.

---

[261] Michael B. Soleta, *Office of the Comptroller of the Currency Proposal to Charter Special Purpose National Banks for FinTech Companies*, 5, SULLIVAN & CROMWELL LLP, WHITE PAPER (Dec. 4 2016) https://www.sullcrom.com/siteFiles/Publications/SC_Publication_OfficeoftheComptrolleroftheCurrencyProposal.pdf.

[262] *Id.* at 5.

[263] *Id.* at 6.

[264] *See id.*

[265] *See, e.g.,* Adrienne Harris and Alexis Zerden, *A Framework for FinTech*, THE WHITE HOUSE (Jan. 13, 2017, 6:36 PM), https://obamawhitehouse.archives.gov/blog/2017/01/13/framework-fintech..; Financial Regulation Case Study*, OCC Chartering Consideration: Creating a Federal Charter for FinTech Firms*, HARVARD LAW SCHOOL 1-2 (Sep. 2016), https://wiki.harvard.edu/confluence/download/attachments/204380235/Execution%20Version%20of%20OCC%20FinTech%20Charter%20Problem.pdf.

[266] *See generally* Conrad G. Bahle & Marija Pecar*, Unblocking the Blockchain: Regulating Distributed Ledger Technology,* 36 NO. 10 FUTURES & DERIVATIVES L. REP. NL 1 (2016).

CONCLUSION

FinTech is rapidly evolving and patent protection could promote additional innovation and investment. If Satoshi Nakamoto had filed a patent application, Blockchain would have been found patent-eligible. Additionally, Blockchain technology that focuses on improving existing computer technology in meaningful ways will likely be found patent-eligible. These improvements cannot involve implementing well understood business practices generically over a computer. They must possess a specific application and must be engineered to overcome specific technological problems. If a Blockchain patent represents a major leap over existing technology, it will likely be patent-eligible. As patent rights are granted, uniform national regulations are needed for Blockchain. Blockchain is a global technology that is expected to have a major impact on the world in which we live. Uniform regulation will protect consumers, add transparency to Blockchain, and help spur innovation.